

**A REPORT OF THE AAWG
RECOMMENDATIONS FOR REGULATORY ACTION TO PREVENT
WIDESPREAD FATIGUE DAMAGE IN THE COMMERCIAL AIRPLANE FLEET**

11.0 CONCLUSIONS

The following conclusions were reached as a result of this tasking.

- With respect to the 1993 AAWG Report entitled Structural Fatigue Evaluation for Aging Airplanes
 - That the conclusions and recommendations of the 1993 AAWG Report are still generally applicable.
 - That AC 91-56A, released in April 1998 by the FAA has many inconsistencies in use of terminology and should be corrected.
 - That the list of structure susceptible to MSD/MED from the 1993 AAWG Report has been validated and expanded to include additional examples from industry experience.
 - That interaction of discrete source damage and MSD/MED need not be considered as assessment of total risk is within acceptable limits.
 - That because of the instances of MSD/MED in the fleet and the continued reliance on surveillance types of inspections to discover such damage, rules and advisory material should be developed that would provide specific programs to preclude WFD in the fleet.
- With respect to maintenance programs:
 - That an effective aging airplane program including a Mandatory Modification Program, Corrosion Prevention and Control Program, Repair Assessment Program, and a structural supplemental inspection program (SSID or ALI) is a necessary prerequisite for an effective program for MSD/MED.
 - That as long as there is an effective corrosion prevention and control program, interaction of MSD/MED with environmental degradation is minimized.
 - That the use of a Monitoring Period for the management of potential multiple site damage and multiple element damage (MSD/MED) scenarios in the fleet is possible if MSD/MED cracking is detectable before the structure loses its required residual strength.
 - That any program established to correct MSD or MED in the fleet needs careful consideration for the necessary lead times to develop resources to implement fleet action.
- That there is no universally acceptable or required damage size used for certification compliance.

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- With respect to research programs:
 - That additional research into the residual strength behavior of structure with MSD/MED should be conducted to supplement existing database.
 - That the highest potential to achieve the necessary improvements of flaw detectability is seen in the field of semi-automated eddy current systems.
- With respect to the Fleet Health and MSD:
 - That every pre-amendment 45 commercial jet type airplane has had instances of MSD/MED in either test or service.
 - That normal inspections (e.g. maintenance programs plus aging airplane programs) conducted by the airlines using procedures developed by the manufacturer have found numerous instances of MSD/MED in the fleet since 1988.
 - That the value of SDRs in determining the health of the fleet with respect to MSD/MED occurrence is limited.
- With respect to Analytical Assessment of MSD/MED:
 - Sufficient technology exists to complete the audit in a conservative manner.
 - That most OEMs have voluntary WFD audit programs in progress.
 - That damage scenarios involving combinations of MSD and MED must be considered if there is a possibility of interaction.
 - That the AAWG participating manufacturers have developed different but viable means of calculating the necessary parameters to characterize MSD/MED and define appropriate maintenance actions whether it be a monitoring period or structure modification/replacement.
 - That the analysis procedures used to characterize MSD/MED scenarios on airplanes needs careful correlation with test and service evidence.